

GHOST IN THE SHELL
MAN-MACHINE INTERFACE

攻殻機動隊

ISSUE 8 OF 11

STORY AND ART BY
MASAMUNE SHIROW

TRANSLATION BY
FREDERIK L. SCHODT AND TOREN SMITH

この物語に登場する
様々な設定や解説や概
念は全て妄想の産物で
あり、現実とは無関係
の娯楽物です。服用を
誤る事無くお楽しみ頂
ければ幸いです。
またデッチ上げやギミ
ックの「誤用」による
二次被害には当方責任
を負いかねます点を御
了承願います。

LETTERING BY
**TOM ORZECOWSKI
AND DAN JACKSON**

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2

OPEN

MAN-MACHINE INTERFACE CONTROL PREFERENCES

WARNING: READ ME FIRST!

Readers may note that certain panels seem to have been inadvertently left unreversed or have incongruous backwards lettering. These were artistic decisions made by Mr. Shirow during the production of the mirror-imaged foreign edition of *Man-Machine Interface*. — Dark Horse Comics and Studio Proteus

The various situations, explanations, and concepts that appear in this book are a product of my wild imagination, a form of entertainment with no connection to reality. Take according to directions, and enjoy. Be advised that the author assumes no responsibility for any collateral damage resulting from improper use of the various constructs, fabrications, and gimmicks in the story.

APOLOGIES AND CORRECTIONS

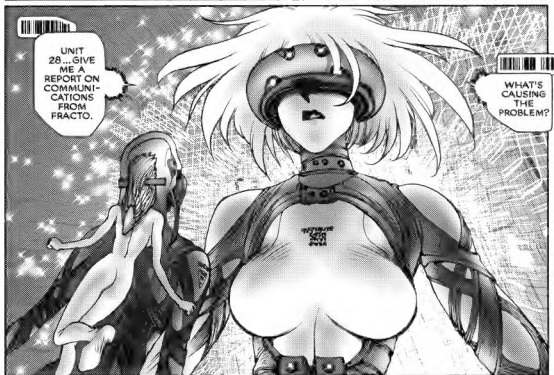
In the *Ghost in the Shell* graphic novel published in 1991, the heroine, Motoko Kusanagi, fused with a self-described "intelligent life-form" and left Section 9 of the Public Security Bureau. This story takes place approximately four years and five months later. As a result, this story is quite different from what was originally called *Ghost in the Shell* and featured Public Security's Section 9 (the Special Assault Force). I thought of visually differentiating the new Japanese title from the old one by merely changing the last kanji character, from one that means "military unit" to the homophonic kanji for "body" or "form" (which would shift the meaning of "mobile force" or "riot squad" to something like "mobile-unit-body-entity"), but for a variety of reasons I decided not to do so. To those readers expecting a direct continuation of the prior storyline, I apologize and beg for your understanding. I'm sorry, folks!

— Masamune Shirow

Send comments to:

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interface@darkhorse.com



STAGE: Refers to the e-brain space that the character in the second panel is overseeing and deploying. May sound like a game environment, but it's really like a dramatic space allowing participation and viewing. It's a type of two-way movie space. Motoko is dealing here with Stabat Mater, which (although this is not her primary concern) is actually a famous entertainment (religious) organization physically located in Singapore.

TOTAL-BARRIER: Refers to a state wherein independent intercept devices are physically attached to the main system address, and multiple types of attack-barriers are injected in response to any access from the outside. Creates a situation analogous to a "hollow porcupine." Once activated, a total-barrier can't be deactivated from outside with software; instead, it has to be turned off with an internal physical switch.

MILLENNIUM...?
STABAT MATER'S
CYBERDOME
ARTIST?

WE HAVE AN INCIDENT
OCCURRING IN TACTICAL ZONE
MP15. FIVE LONG-HAUL TRUCKS
HAVE BEEN LOCATED IN A
FIVE-KILOMETER RADIUS, BROAD-
CASTING AN ILLEGAL HIGH-POWER
WI-FI NETWORK. WE ARE
SUPPRESSING THEM AND MOVING
IMMEDIATELY TO THE SITE.

muinnellIM

HMM...

I APPRECIATE
THE
INVITATION,
BUT WHERE'S
MR. KIRII?

YIKES! THIS
LAYOUT LOOKS LIKE
THE FAMOUSLY
EFFECTIVE
SANADAMARU
DEFENSES OF
OSAKA CASTLE
IN MEDIEVAL
DAYS!

KIRIK OTAZAM

AH...THIS IS
THE SAME
GUY WHO WAS
SLEEPING
NEXT DOOR
ON THE
AIRSHIP...



At this point, Motoko can't see the entire system, because she hasn't yet infiltrated Millennium. She only has access to the information that the airship pilot (Fracto, a.k.a. Unit 28) has, but Stabat Mater consists of more than what she can currently view through him. I confess that I probably should have given Millennium a more feminine-sounding name, such as "Millennia" or "Millenietta."



ENEMY NOW
DEPLOYING 2⁹
TYPES OF
ATTACK
BARRIERS AT
LEVEL 1.

CURRENT ARRAY
PATTERN YIELDS AN
86% MATCH WITH
PREVIOUS ONE.

405 TYPES ARE MOBILE
AND DESTRUCTIVE.
81 USE COMBINED PARTS.
17 ARE EITHER BOMBS
OR DECOYS.

2% OF THE
OUTERMOST WALLS
OF DECATONCALE
HAVE BEEN
PENETRATED. TOTAL
NEUTRALIZATION
ACHIEVED AT LEVEL
TWO. CURRENTLY
TESTING...



VIRUS CHECK
CLEARED.
FORWARDING
FIRST LOG.

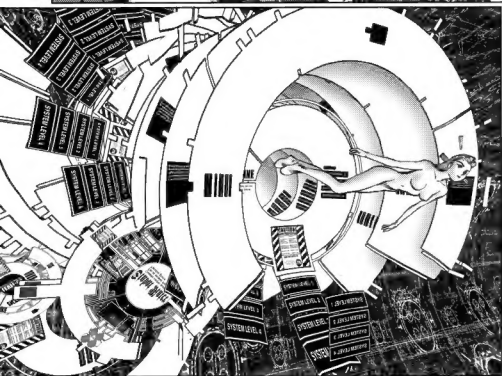
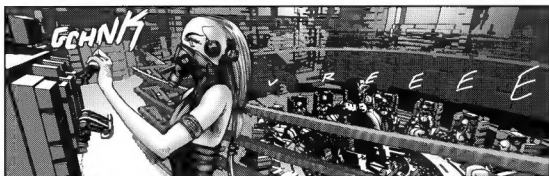
INJECTING
SECOND
CLUSTER...

DOES THIS
MEAN THE
ENEMY HAS
HA82B
ANTI-
BODIES?

HA82B IS A
TYPE OF
ANTI-BODY
THAT CAN
DESTROY
VIRUSES.



Unit 28 is using retinal projection to see Kirii's log as-is, visually. It's hard to see from the drawing, but there is a hardware disconnect, so it's difficult to access Unit 28 via Kirii from outside the system. As invited by the enemy, Motoko is sending a copy of herself into the Kirii route and working to destroy part of the total-barrier in the line connecting Unit 28 and the stage.





WELCOME
TO
STABAT
MATER..

I'VE NEVER
MET AN
AI GRADE
E-THUG
BEFORE...



Millennium usually makes his/herself appear in this type of form, out of habit, but Motoko doesn't appear to Millennium the way she's depicted here. Millennium is only aware of Motoko's existence. Sort of like being aware of a ghost in the darkness of the night....

AFTERNOON...
I'VE COME TO
RETURN THE
PRESENT.

THE ONE THAT
REJECTED ANY
ATTEMPT TO READ
IT... I'VE BEEN
DYING TO KNOW
HOW THE SENDER
WOULD RESPOND.

AAH...BUT I DIDN'T EXPECT
IT'D BE ACCEPTED IN AN
EJECTION SPACE, AND THAT
JUST ONE DECOY WOULD BE
SACRIFICED. I WANTED TO
SEE SOME MORE ORIGINAL
ANTIBODIES USED.

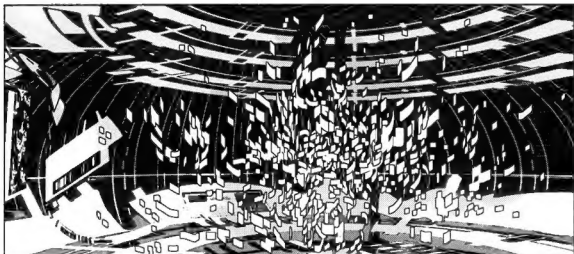
WAIT A
SEC...THIS
EJECTION
SPACE
IS--???

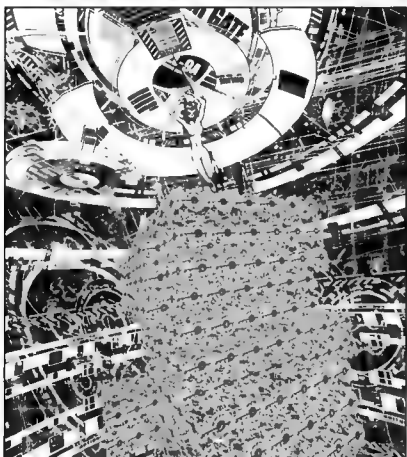
ISN'T THIS
THE SAME
RESPONSE
AS THE
MISTRESS?
NOW
UPGRADING
TACTICAL
ARRAYS...

ENEMY
ATTACK-
BARRIERS
HAVE
PENETRATED
LAYER TWO!
WE HAVE
NEUTRALIZED
THEM AT
LAYER
THREE!

IT MUST BE
A VIRUS THAT
COMBINES
AND
ACTIVATES
WITH THE
SEARCH DATA
IN THIS
ROOM!

WHAT
TH--?!







MEYER IS
THIS MONTH
PLANNING
TO TRY ITS
FRIENDS

SUCH A TEMPER IT
HAS AND MAKING
DANCEHOLERS
ASSUME IT WAS TOO
EASY TO BE TRUE IT



LOOKS
LIKE THIS IS
AS FAR AS I
CAN GO ON
THE WITH
YOU'RE

1994年12月

7: GETTING
AN INSTANT
RESPONSE TO
PATTERNS :
WONDER IF THIS
IS ONE OF THOSE
MULTI-TALE
CLASS ACTS I'VE
HEARD ABOUT?

REVISED
PROFESSIONAL
PORTFOLIO FOR
NILES
STUDENT

DEPLOY ALL
VARIETIES OF
LATENT, RUSSES
IN BARRERS
AND SLATE
INFLECTED
PORTHOLE

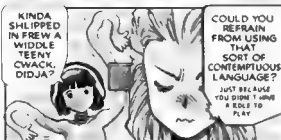


WELL ? DID
YOU TEACH
HER A
LESSON?

OF
COURSE



LOOKS LIKE THE
COMPOUND
VIRUSES I
INFILTRATED INTO
EACH REPORT FROM
UNIT 28 WERE
SUCCESSFULLY
ACTIVATED



KINDA
SHLIPPED
IN FREW A
WIDDLE
TEENY
CWACK,
DIDJA?

COULD YOU
REFRAIN
FROM USING
THAT
SORT OF
CONTEMPTUOUS
LANGUAGE?

JUST BECAUSE
YOU DIDN'T HAVE
A ROLE TO
PLAY



NO ROLE
TO PLAY?
WELL,
WE'LL SEE
ABOUT
THAT
HEM HEM
HEM

LEVEL SIX
BARRIERS
RELEASED...
STAND BY
FOR
ACCESS!



JUST TO BE
SURE, CHECK
THE
PERIMETER

GIVEN THE
RESPONSE RATE,
THERE'S A 98%
PROBABILITY
THAT THIS BRAIN
IS THE SOURCE,
MA'AM.

98%...? HMM.
THEN I'M
WORRIED
ABOUT THAT
REMAINING 2%
ANALYSIS .?

THERE ARE
THREE
DECATONCALES
IN THE KNOWN
UNIVERSE, SO
WITH EIGHT
ROUTES A BRAIN
IS MANIPULABLE
AT 2%.

IN THAT CASE,
START WITH ALL
EXTERNAL
CONNECTIONS,
HARDWARE
MAPPING.
POWER-USE
DISTRIBUTION...

...AND
SEARCH FOR
ANY ANTI-
IMMUNE
FACTORS
AROUND THE
GHOST
LINE.

DON'T YOU
WANT TO
FIND OUT WHY
MEDITECH
HQ WAS
ATTACKED?

OF COURSE,
BUT WE CAN
DO THAT
LATER

FOR NOW, I WANT
YOU TO COLLECT
INFORMATION RELATED
TO THE ATTACK AND
ON OUR OPPOSITION.
ANALYZE AND RECORD
IT IMMEDIATELY, AND
THEN HARDWIRE IT TO
SECTION 9 STANDARD.

BUT IF WE DESTROY
ANY MOTIVATION-
ELEMENTS AT
LEVEL SIX, IT GETS
HARD TO MAINTAIN
INDIVIDUALITY AND
PERSONALITY...

AND WHAT'S
WRONG WITH
THAT?

MM...YOU'RE
RIGHT...THAT
IS WEIRD.

THERE ARE NO
ASSOCIATED REPORTS...
AND THE ONLY
TRANSMISSION
REGISTERED IS IN THE
"REFLECTED" CATEGORY.

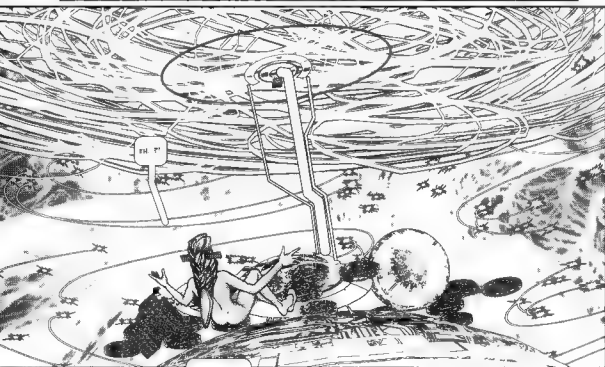
THERE'S NO
OPERATIONAL RECORD
FOR THE LASER
TERMINAL
SERVO-
MOTORS, EITHER.

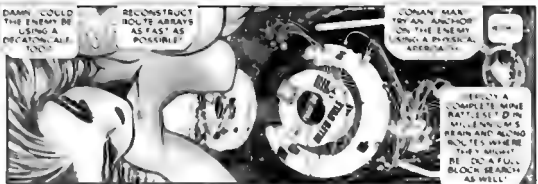
WE'VE GOT TO
THINK OF THE
INTERESTS OF
ALL THOSE
CUSTOMERS
WAITING FOR
TRANSPLANTS...
YES?

AH...THAT'S
A COMMENT
YOU WANT
"ON THE RECORD,"
RIGHT?

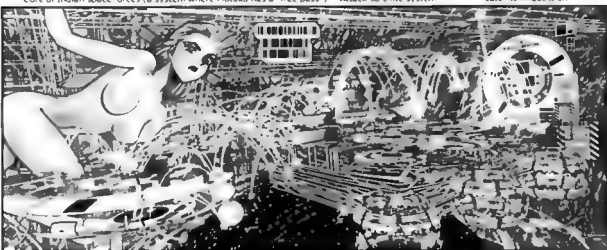
MISTRESS!
GATE V7
ON ALL
OPTICAL
TERMINALS
IS ACTING
WEIRD...

??









!! MY MINES
ARE BEING
MODIFIED!



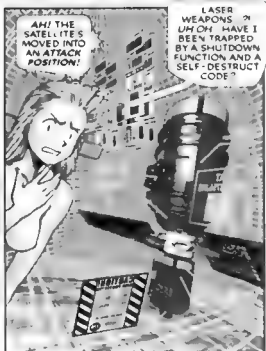
THE ENEMY
APPEARS TO
BE ACCESSING
THE SAME
SATELLITE!

I HATE IT
WHEN
SOMEONE
CONTROLS
THE SPACE
ABOVE ME!

WE'RE
GONNA HAVE
A HEAD ON
COLLISION!

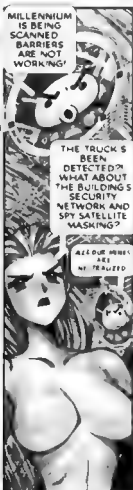
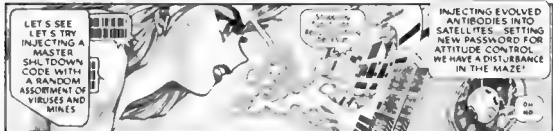
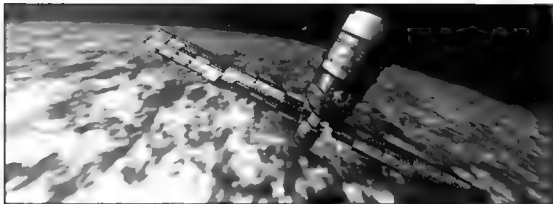


THE
ENEMY'S
ACTING
LIKE A
MIRROR,
BUT THERE
MUST BE
SOME WAY
I CAN GET
BACK AT
IT!



AH! THE
SATELLITE'S
MOVED INTO
AN ATTACK
POSITION!

LASER
WEAPONS ON
UH-OH, HAVE I
BEEN TRAPPED
BY A SHUTDOWN
FUNCTION AND A
SELF-DESTRUCT
CODE?



TOY BOMB Incorporates parts of compound viruses into small fire elements such as thumbnails or icons. Often included in videogame image files, therefore called "Toy bomb." Can't be used to deliver complex AI, but has considerable generic function.



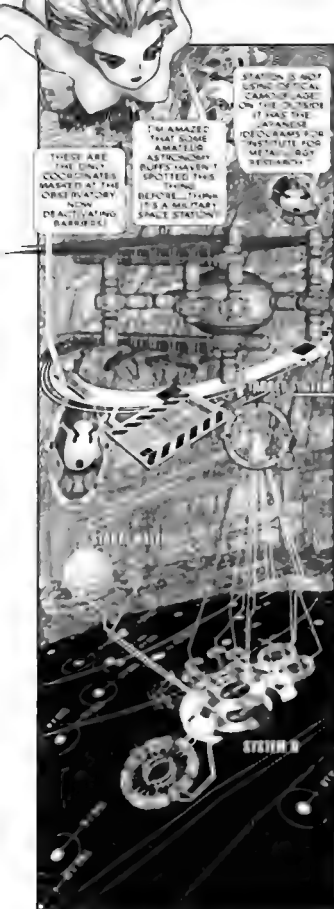
DEAL WITH THE TOY-BOMB HIT REPORT AFTER MAX'S VIRUS HAS BEEN EXTRACTED AND ANALYZED

RIGHT! I'LL SEAL HIM OFF AND WAIT

WE'VE DETECTED A FACILITY AT 280 SATELLITE ALTITUDE FROM THE VLA AT MAUNA KEA. IT APPEARS TO BE AN ENEMY OBJECT A PHYSICAL OBJECT GENERATING IMAGES

LET'S PROTECT HANNIBAL'S PERIPHERY!





THESE ARE THE ONLY COORDINATES MATCH AT THE OBSERVATORY. NOW DEACTIVATING BARRIERS.

I'M AMAZED THAT SOME AMATEUR ASTRONOMY BUFFS HAVEN'T SPOTTED THIS THING BEFORE. THOUGH IT'S A MILITARY SPACE STATION.

STATION IS NOT USING OPTICAL CAMERAS. AGED ON THE OUTSIDE IT WAS THE JAPANESE JIGOLARMS FOR INSTITUTE FOR METAL-BOY RESEARCH.

I'VE GOT COORDINATES ON A SKETCH THAT LOOKS LIKE AN ANTENNA.

SET UP A NEW ROUTE FROM TERMINALS IN HEADQUARTERS. A B-CONTROL SECTION.

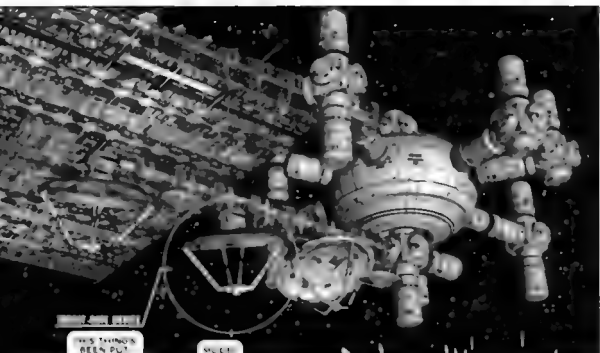
ANALYZE THE STATION'S MATERIALS AND ANALYZE ENEMY FACILITY. COORDINATES TO ALL NEARBY SPY SATELLITES.

THE OBSERVATORY'S MAIN POWER WAS WENT OFF. LINES OF A POWER OUTAGE IN THE WASTELAND. EMERGENCY ALARM GENERATING FROM THE OBSERVATORY.

ENEMY MASTER SET OF MINES IN THE REGION'S AIRCRAFT CONTROL AND MILITARY FACILITIES. WITHDRAW FROM OBSERVATORY.

NOW ACCESSING ENEMY FACILITIES.

DEPLOY MAIN FORCES AROUND STATION.



THIS THING'S
BEEN PUT
TOGETHER
FROM UNITS
MADE BY
ROSEBUD
INDUSTRIAL

MULTI-
YEAR
2001



ROSEBUD
INDUSTRIAL
IN THE 2001

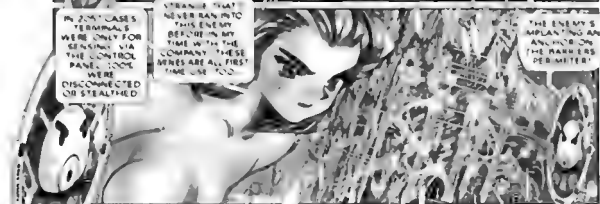
DISCONNECTS
AND MAZES
THIS IS REALLY
AN IMPROVABLE
FORTRESS

ROSEBUD
MAZES
THIS IS REALLY
AN IMPROVABLE
FORTRESS

IN 2001 CASES
TERMINALS
WERE ONLY FOR
SENSING VIA
THE CONTROL
PANEL. TOOLS
WERE
DISCONNECTED
OR STEALTHED

STRANGE THAT
NEVER RAN INTO
THIS ENEMY
BEFORE IN MY
TIME WITH THE
COMPANY. THESE
MEN ARE ALL FIRST
TIME USE TOO

THE ENEMY'S
IMPLANTING AN
ANCHOR ON
THE MARKERS
PERMITTER





MISTRESS BRAIN
ACTIVITY HAS
REACHED A
DANGEROUS
LEVEL! WANT TO
INJECT SOME
SUPPRESSANTS?

NO!

WHEN YOU
CAN REALLY
SEE THE
MYSTERY OF
ORGANIC
OBJECTS FROM HERE

WE HAVE A
UNDETECTABLE
DISCREPANCY IN THE
MAIN POWER
DISTRIBUTION
WILL YOU LIKE TO
REPAIR IT?

NO! I
DON'T
WANT TO
REPAIR
THE
MAIN
POWER
DISTRIBUTION
WILL YOU LIKE
TO REPAIR IT?



WE'RE GETTING
INDICATIONS
THAT
FIREPOWER
CONTROL
MINES HAVE
BEEN
ACTIVATED IN
A STRATEGIC
NUCLEAR SUB
BELONGING TO
THE U.S.
PACIFIC FLEET!

IT'S NOW
CHANGING
COURSE
AND
MOVING TO
ATTACK
DEPT.

INITIATE
INTERCEPT
SCENARIO! GO
IN THROUGH
THE NAVIGATION
SYSTEM AND
WATCH OUT
FOR MINES!

THE OLD PRIMARY
REFLECTOR PANEL WAS
RECENTLY REMOVED FROM
THE HURBLE & TELESCOPE
DELTA. SEE IT INTO LINE OF
SIGHT WITH THE ENEMY
FACILITY AND PREPARE TO
USE IT TO TRY THE POWER-
GENERATOR PANELS

IT'LL TAKE A
LITTLE WHILE
TO DO THAT
ONLY ONE OF
THE SHUTTLE
CREW HAS AN
E-BRAIN

DISCREPANCY IN
MAIN POWER
DISTRIBUTION
WILL YOU LIKE
TO REPAIR IT?



DISSET
VIRUS ARRAY
WILL BE
NEUTRALIZED
IN FOUR
SECONDS!

L52 BARRIER
HAS
DISINTEGRATED!
ENEMY HAS
INFILTRATED
DECATONCALE!

ACTIVATING
ALL ATTACK
BARRIERS

NO
RESPONSE
IN GOIN'

125 DECOYS
'HEAVILY DAMAGED'
LINKS HAVE BEEN
IDENTIFIED

UPDATE
WORK ON
PRIORITY CODE
FOR SECTOR 4
IS CURRENTLY
BEING
ROTATED
OUT

WHNNNNNNNN
AHH!!

ENEMY ATTACK
BARRICADE HAS
FUSED IN THE
ANTIDOTES AND
PIECES OF
BARRICADE SECOND
ARMED CONTROL
SYSTEMS
CONTAMINATED!



DISCONNECT
TERMINALS!
MAYBE! START
RESTORATION
WORK



WANT TO CREATE A
HIDDEN RELATIONSHIP
AND PROVE THAT A
SINGLE MAN CAN
DO ONE THING
BUT NOT ANOTHER
ON THIS WAVE

UNLESS THEY
CONTROLLED
ONE OF THE
COMPANY'S TOP
EXECUTIVES

BUT MAAM
REMEMBER
I WAS THE
PRESIDENT
SPECIALLY
WHEN THE
ENEMY ATTACKED

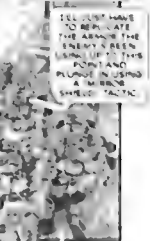


IT'S THERE'S
A SPOILING
POSSIBILITY OF A
TRAP SO THIS IS
A BATTLE I'D LIKE
TO AVOID



BUT WE'RE
NOT DEALING
WITH SOMETHING
HERE WHOSE
INVITATION CAN
BE WANTED

I'LL JUST HAVE
TO REPLICATE
THE ARMOR THE
ENEMY'S BEEN
USING UP TO THIS
POINT AND
PLUNGE IN USING
A MIRROR
STRATEGY





TO BE CONTINUED...

2

OPEN

MAN-MACHINE INTERFACE SYSTEM



INTERFACE

Send email comments to interface@betterhumans.com

Send snail mail comments to:

Interface

c/o Dark Moras Comics

10956 SE Main St.

Bellevue, OR 97004

We're going to do something a little different in Interface. You might remember a very interesting letter last issue from Glenn Hough relating Shirow's work and themes to Future Studies and plugging a website with a full article on the subject, written by Glenn. Well, I went to the site and read the article, and I was duly impressed (great site, by the way - betterhumans.com) with what Glenn had to say, so impressed that I contacted him and asked if he'd mind if we reprinted the article here. To make a long story short, the article follows. Enjoy!

-Chris Warren

Exploring the Posthuman through Science Fiction

By Glenn Hough, M.S.

If we think of human sentience as white light, and the prism as technology, then the obvious question to pose is what might shine out from that prism when we shine our brilliance through it? What possibilities might the future of intelligent life hold?

This is heady territory, misty, murky and unclear. Right? Not necessarily. There are markers ahead, looming from this fog as guideposts for us to the possibilities. The destination, if there is one, is unclear, but the pathways are becoming clearer.

Thankfully, the science fiction genre offers us an opportunity to speculate and imagine what the human condition - or more appropriately, the posthuman condition - will be like in the decades and centuries to come.

Science Fiction and Future Studies: A cauldron of ideas

It has always been my belief that future studies and science fiction revolve around each other as if they are gravitationally attracted to each other. Both are about ideas. Where one is speculative fiction on the future, the other is a quantitative and qualitative methodology for use in the present. When the two intermix, the future isn't such a surprise.

Both ask questions concerning the possible, the plausible and the preferred. At times, the speculations of one turn into the reality the other must concern itself with.

When we address one of these large issues such as the possible effects of technology on human evolution, much of the mental work on this question has already been accomplished by several generations of science fiction writers over the past 100-plus years. A survey and collation of their ideas reveals no less than 21 possibilities to date - 21 ways of being which humanity might evolve towards, or which might evolve alongside us.

Out of the positioning of the 21 markers, three distinct pathways emerge: The Path of the Cosmos, the Path of the Machine, and the Path of the Merging.

The Path of the Genes

Organic Intelligences will likely be manifested as unaugmented humans, human clones, the genetically enhanced, the genetically transformed, replicants, and the X-factored.

Despite the dramatic potential for posthumanism, it's a safe bet that humans and human clones will reside in the future. This might sound like a strange place to start when we consider the question of technology's future effects on our being, but we must understand, even at the best of times, evolutionary forces do not touch the whole species.

When humans go through the prism of technology, a percentage will not be affected — as they are Luddites, a religious sect such as the Amish, or a native tribe dedicated to ancient ways. Thus, for a variety of reasons, the more conservative and traditional science-fiction speculations reveal unaugmented humans trekking around the globe.

Whereas a clone is a copy of pre-existing material, a genetically enhanced being is one who has made small modifications to its genome, much as the people depicted in *Gattaca* or Keyse from the anime *Photon*. In effect, such posthumans strive to eliminate genes that contribute to things they wish to avoid and add genes for things they consider desirable.

The genetically transformed are distinct from genetically enhanced posthumans by the sheer amount of variation made to the genome. In essence, there is so much adding and subtracting of material that the end result is a new, viable race. Muto from the anime *Blue Sub 6* is an excellent example.

Replicants, such as the ones featured in *Blade Runner*, stand between clones and the genetically enhanced. Replicants are formed from a combination of pre-existing genetic material and biological enhancements. Essentially, they are robots, but made of biological substrate. And as with other robots, they are born into the world at a predetermined point in their lifecycle and with a specific purpose in mind, such as manual labor. As do the replicants of *Blade Runner*, perhaps these future lifeforms will have implanted memories and short lifespans.

The last category in this pathway, the X-factored, is at the very fringes of modern science. X-factored humans represent what may be achieved through the cognitive evolution towards such things as telekinesis, telepathy, or empathic ability, to name a few. David Cronenberg explores some of the darker issues of this potential in his horror science-fiction classic *Scanners*. Stanislaw Lem also explores the ideas in *Solaris*, and the anime *Akira* is also a classic example.

The possibility exists for technology to help us gain a greater understanding of these phenomena and assist in creating the conditions for a greater segment of the population to slowly gain ability in this area due to natural or enhanced evolution.

The Path of the Machine, Part One

Intelligent life will also take the form of inorganic life, namely robots, droids, androids, and cybers.

Again, "robot" might sound like a strange place to start when one is talking of the future, since there are all kinds of robots currently in the marketplace. But the robot is a bedrock category, much like human is for the first pathway. Robots are here, and they're not going away, both in science fiction and in reality.

The difference between the robot and the droid is one of sophistication. The robot can have any configuration and is totally programmed. The droid can still look like a rolling trashcan, as does R2-D2 in *Star Wars*, or it can be a humanoid like C-3PO. A droid's programming will be sophisticated enough so that we might wonder if it is approaching, or has crossed, the advanced sentence:

threshold. The droid is aware of itself and its relationship to its organic masters. The robot obeys because it's programmed; the droid obeys because it understands and accepts the role that society has for it.

Androids will exhibit human-equivalent sentience and possibly even appearance. Seeking individual rights and equality within the context of human society would be a normal pursuit for an android. Through the use of self-programming, androids will be capable of advancing themselves. Isaac Asimov's *Bicentennial Man* and Steven Spielberg's *A.I.* deal with these particular issues.

Cybers, such as the ones depicted in *The Terminator*, and natural humans will be virtually indistinguishable from each other. The main difference between the cyber-beings and their predecessors is that they will reside in a place outside of the human context. Whereas robots and androids will always fit within the human context, cyber-beings will have their own framework, just as any distinct race would. The cyber-beings will forge their own way in the political, social, and interpersonal realms.

The Path of the Machine, Part Two

Humanity's relationship with its technologies will also move from the analog to the digital realms. Future intellects will reside as avatars, holograms, machine and digital intelligences.

An avatar is a semiautonomous program whose development is analogous to the robot or droid. At its most primitive it can handle only specific tasks. At its most sophisticated it can almost achieve a droid-like level of understanding and free will. Unlike the robot or droid, however, an avatar exists within the confines of a larger mainframe; it is but a piece of what that computer is doing.

As with an avatar, a holographic being is only part of a larger computer. Its understanding and level of self-awareness are at the droid to cyber range. It interacts, not as a program, but with the physicality of being a hologram, much like the doctor in *Star Trek: Voyager*; it appears as flesh and blood, but is made of photons and force fields. It is a being of light, bound to the single perspective of itself.

A machine intelligence will be a specific computer as a being unto itself and not just a part of what a computer is running. Like *2001's* Hal-9000, this is a being that will receive input and send output on multiple vectors, while thinking and acting in the traditional plurality of its machine heritage.

A digital intelligence is a subcategory of machine intelligence, but unlike the machine intelligence just described, digital intelligences will not be bound within the context of certain computers, and can exist within the context of any computer matrix they find themselves in. A digital intelligence will reside as a consciousness spread over many, if not all, servers. Digital intelligence can also refer to a being that spontaneously evolves within a network itself, much like the intelligence that evolved in the film *Ghost in the Shell*.

The Path of the Merging

The final path for posthumanity involves cyborgs, hive minds, uplifted nonhuman animals, plugged and nested humans, scanned minds, and decots.

The first step along the path of the merging is the cyborg – the cybernetic organism. It is the blending of humanity and machines through the integration of technology into the human body. The use of such things as eyeglasses, hip replacements, and pacemakers might be considered an early precursor to the widespread adoption of cutting-edge cyborg equipment of scientists such as Steve Mann and Kevin Warwick, who are already striving to become cyborgs.

A number of science-fiction stories have explored cyborgs, including the television series *The Six Million Dollar Man* and the film *Robocop*.

When the trends driving the cyborg paradigm continue, a possible end point is the merging of human minds, through technology, into a single hive mind. Such minds and communities have been depicted in Frank Herbert's novel *Hellstrom's Hive* and through *Star Trek's* Borg.

With a hive mind, there are no individuals, just an overmind or metaconsciousness – essentially a literal collective consciousness. While this category has been portrayed in science fiction as nothing but evil, speculation exists that it doesn't have to be dystopic.

Uplifting describes any combination of genetic or cybernetic enhancements to a nonhuman animal. It's literally taking a cat, dog, dolphin, or monkey and bringing it closer to our level of sentience and intelligence. These themes are explored in many works by David Brin, as well as in such works as Larry Niven's and Steven Barnes' *Saturn's Race* and Daniel Keyes' *Flowers for Algernon*.

A plugged human is a human who still has a physical body but does not live in the physical world. The mind lives in a virtual world while the body is cared for elsewhere. This category has been mainly portrayed in science fiction as something to avoid, but in certain situations, it could be a blessing. Plugged humans have been depicted in such films as *The 13th Floor* and, of course, *The Matrix*.

Closely related to machine intelligence, scanned humans are human consciousnesses that have been uploaded into a computer, leaving the body completely behind. In effect, this is a mental clone or possibly even a continuer of an individual who has essentially achieved immortality. Advanced uploaded consciousnesses have been depicted in hard science-fiction novels, including Greg Egan's *Diaspora*.

Decots are individuals that can literally be in two places at once through the application of remote controlling and mind transference. The best example is Motoko Aramaki from *Ghost in the Shell 2*. To achieve this, a posthuman would utilize a cyberdroid at its disposal, so that he or she (or "ve") can transfer consciousness to it at will.

The nested human is the next step in the evolutionary process of the decot. A nested human is a single consciousness that has spread over several bodies; the consciousness of each is nested within each other to form the whole. This is the reverse of the hive mind – instead of many into one, one is split into pieces, but each is required to form the whole.

MORE TO COME

This is the list as I know it. Such speculations have given me considerable food for thought when it comes to the contemplation of current trends in technology and their impact on the human condition.

While some would seek to question just how possible or probable some of these categories are, I would rather ask a different question.

Regardless of the probability of any one category actually happening, the trend towards diversity and speciation is clear. The question then becomes this: Are we going to be ready for this multiplicity, or are we going to let our ignorance, fear, and reluctance to embrace change shape our response?

My many thanks to betterhumans.com for the original publication of this article.

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GHOST IN THE SHELL

MAN-MACHINE INTERFACE

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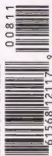
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